

Claims

- [c1] 1.A braking apparatus comprising:
- a brake pedal operative to reduce vehicle speed and coupled to a brake position sensor, said brake position sensor being operative to generate a brake position signal;
 - a brake pedal actuator coupled to said brake pedal and operative to generate a variable brake feel force to said brake pedal;
 - a forward detection apparatus operative to detect vehicle distance and relative vehicle speed and generate a vehicle distance signal and a relative vehicle speed signal; and
 - a controller coupled to said brake pedal actuator and being operative to receive said brake position signal, said vehicle distance signal, and said vehicle speed signal, said controller including control logic operative to modify said variable brake feel force in proportion to said brake position signal, said vehicle distance signal and said vehicle speed signal.
- [c2] 2.The braking apparatus as recited in claim 1, wherein said variable brake feel force is reduced in proportion to said brake position signal, said vehicle distance signal and said vehicle speed signal.
- [c3] 3.The braking apparatus as recited in claim 1, wherein said variable brake feel force induces a driver to apply an increased brake pedal force..
- [c4] 4.The braking apparatus as recited in claim 1, further comprising a visible warning apparatus coupled to and controlled by said controller.
- [c5] 5.The braking apparatus as recited in claim 4, wherein said visible warning apparatus emits a visible signal having a variable color and a variable intensity.
- [c6] 6.The braking apparatus as recited in claim 5, wherein said controller includes control logic operative generate said color and said intensity in proportion to said brake position signal, said vehicle distance signal and said vehicle speed signal.
- [c7] 7.The braking apparatus as recited in claim 1, further comprising an audible warning apparatus coupled to and controlled by said controller.

- [c8] 8.The braking apparatus as recited in claim 7, wherein said audible warning apparatus emits an audible signal having a variable frequency and a variable volume.
- [c9] 9.The braking apparatus as recited in claim 8, wherein said controller includes control logic operative generate said frequency and said volume in proportion to said brake position signal, said vehicle distance signal and said vehicle speed signal.
- [c10] 10.A brake system for a vehicle comprising:
a brake pedal located in the vehicle and operative to reduce vehicle speed, said brake pedal coupled to a brake position sensor, said brake position sensor being operative to generate a brake position signal;
a brake pedal actuator located in the vehicle and coupled to said brake pedal, said brake pedal actuator operative to generate a variable brake feel force to said brake pedal;
a forward detection apparatus located in the vehicle and operative to detect vehicle distance and relative vehicle speed and generate a vehicle distance signal and a relative vehicle speed signal; and
a controller located in the vehicle and coupled to said brake pedal actuator, said controller operative to receive said brake position signal, said vehicle distance signal, and said vehicle speed signal, said controller including control logic operative to modify said variable brake feel force in proportion to said brake position signal, said vehicle distance signal and said vehicle speed signal.
- [c11] 11.The braking system as recited in claim 10, wherein said variable brake feel force is reduced in proportion to said brake position signal, said vehicle distance signal and said vehicle speed signal.
- [c12] 12.The braking system as recited in claim 10, wherein said variable brake feel force induces a driver to apply an increased brake pedal force.
- [c13] 13.The brake system as recited in claim 12, wherein said controller includes control logic operative generate said color and said intensity in proportion to said brake position signal, said vehicle distance signal and said vehicle speed

signal.

- [c14] 14.The brake system as recited in claim 10, further comprising an audible warning apparatus coupled to and controlled by said controller.
- [c15] 15.The brake system as recited in claim 14, wherein said audible warning apparatus emits an audible signal having a variable frequency and a variable volume.
- [c16] 16.The brake system as recited in claim 15, wherein said controller includes control logic operative generate said frequency and said volume in proportion to said brake position signal, said vehicle distance signal and said vehicle speed signal.
- [c17] 17.A method for providing enhanced braking for a vehicle comprising the steps of:
monitoring a position of a brake pedal;
determining distance and relative speed to a second vehicle; and
modifying a variable brake feel force of the brake pedal in proportion to said position of the brake pedal, said distance, and relative speed to said second vehicle.
- [c18] 18.The method for providing braking stimulation as recited in claim 17 wherein the step of modifying a variable brake feel force of the brake pedal comprises reducing said variable brake feel force of the brake pedal to induce a driver to apply an increased brake pedal force.
- [c19] 19.The method for providing braking stimulation as recited in claim 17 further comprising the step of warning said driver by generating a visible signal having a variable color and variable intensity proportional to said position of the brake pedal, said distance, and relative speed to said second vehicle.
- [c20] 20.The method for providing braking stimulation as recited in claim 17 further comprising the step of warning said driver by generating an audible signal having a variable frequency and variable volume proportional to said position of the brake pedal, said distance, and relative speed to said second vehicle.